

COLORADO KIDS ARE COLLATERAL DAMAGE

IN A THC POTENCY
ARMS RACE

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Overview

In 2018, Smart Colorado released *Colorado Kids Are Canaries in the Coal Mine of Marijuana Commercialization*. That white paper documented the shift in teen marijuana use trends to ultra-potent THC products and the arms race in THC potency among state-licensed marijuana businesses authorized by the passage in 2012 of Amendment 64. Our white paper sounded the alarm concerning the risk from these products to the developing adolescent brain.

Since that December 2018 publication:

- The U.S. Surgeon General issued a statement saying that no amount of marijuana use is safe for the developing brain of an adolescent and for pregnant or breastfeeding women.
- The Colorado Legislature ordered a THC potency study to understand the impact of commercial marijuana products in the state.
- The Colorado Department of Public Health and Environment (CDPHE) released a study of marijuana potency in Colorado.
- CDPHE released comprehensive Healthy Kids Colorado Survey data from 2019, including data on youth marijuana use.
- The Colorado Department of Revenue's Marijuana Enforcement Division (MED) released the third edition of the Market Size and Demand for Marijuana in Colorado report.

This paper updates and builds on *Colorado Kids Are Canaries in the Coal Mine of Marijuana Commercialization*. It relies on more recent studies and data to conclude that the earlier findings were no aberration. In fact, the dangers to Colorado youth are growing.

Eight years after Colorado voters agreed to regulate marijuana similar to alcohol, the state faces numerous concerning measures of use, including:

- Rising frequency of marijuana use by youth, especially those using daily or nearly daily.
- A persisting shift by high schoolers away from smoking marijuana to using radically new THC products with exponentially higher potency.

- Statistically significant increases across the state in youth use of edibles and dabbing ultra-potent THC concentrates in 2017 and dabbing and vaping in 2019.
- Kids obtaining and using the dangerous new products produced by the regulated market.
- Almost double the national rate for daily marijuana use among young adults who were in middle and high school when legalization occurred.

Although detailed surveying techniques vary by state, data show some of the same concerning trends in Colorado are playing out in Oregon and Washington, two other early-adopting recreational marijuana states.

Discussion

Proponents of the latest round of successful marijuana legalization efforts in 2020 claimed that kids will not be hurt by marijuana legalization. They pointed to relatively unchanged rates of marijuana use reported by high schoolers in other legal states. This simplistic data point may have provided a false sense of security to voters.

Regardless of how voters view adult use of marijuana, all should agree that this intoxicating substance is not good for children and teens and their developing brains. Justifying the policy change to full-blown marijuana commercialization as good for kids is unsupported by the evidence.

Not the Same Pot

Marijuana in post-legalization states has changed significantly in terms of both the potencies of products sold and the methods of use. The terms “marijuana” and “cannabis” can encompass everything from mostly CBD, non-intoxicating extracts to almost pure, psychoactive THC distillates (commonly referred to as hash oil, wax or shatter) that are used with a vaporizer or a blow torch-ignited delivery system commonly referred to as a dab rig.

There are no restrictions in Colorado and other adult-use states on the potency of THC products. Consequently, THC products continue to increase in strength as marijuana commercialization has exploded, a potency arms race.



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73% THC shatter for sale in Colorado in 2018. This product is for dabbing. Shatter is sold in other states where marijuana is legal.

The third edition of an analysis of the Colorado Marijuana Market, commissioned by the MED, found that the average potency for marijuana bud (commonly also called flower) sold in stores in 2019 increased 34% in the first six years of commercialization from 14.0% THC in 2014 to 18.8% THC in 2019.

Similar increases were found in THC concentrates used for vaping and dabbing. THC potency in concentrates increased almost 49% in the same six-year period from an average potency of 46.4% THC in 2014 to 69% THC in 2019. This average is for all forms of concentrates. The 2017 Marijuana Market Study noted that some products exceed 90% THC.

These latest potency figures are dramatic when compared to average rates of 3.8% THC potency in the 1990s reported by the National Institute on Drug Abuse.

Colorado sold a record \$2.2 billion of marijuana in 2020. According to MED, demand for flower as a portion of sales has fallen every year since the recreational market opened in 2014, while concentrate sales have increased by 7.6 times. Although flower was still the biggest category in 2020, its market share was below 50% according to The Denver Post.

Similar changes have occurred in Washington state and Oregon. The market share for concentrates has almost quadrupled in Washington since 2014, increasing from 9% to 35% in 2019. In Oregon, flower products had plummeted to less than half the marijuana market by the end of 2018.

Potency Raises Alarms

This THC potency arms race presents a growing threat to public health. Teens are especially at risk from ultra-potent THC products. In August 2019, U.S. Surgeon General Jerome Adams issued an advisory regarding marijuana. He stated: “Recent increases in access to marijuana and in its potency, along with misperceptions of safety of marijuana endanger our most precious resource, our nation’s youth.” Dr. Adams noted: “The risks of physical dependence, addiction, and other negative consequences increase with exposure to high concentrations of THC and the younger the age of initiation.” This was the first time in almost 40 years that the U.S. Surgeon General specifically addressed marijuana. The last time was 1982 under Surgeon General C. Everett Coop.

Dr. Kari Franson of the University of Colorado Anschutz Medical Campus Skaggs School of Pharmacy raised concerns about dabbing super high concentrations of THC with reporter John Ferrugia of Rocky Mountain PBS in 2016. She said: “They’re [dabbers] getting into the 600 to 800 milligrams of THC. . .It’s quite a difference” from the 10mg serving for an edible and the 25mg in a standard joint.

At the behest of the Colorado General Assembly, CDPHE analyzed THC concentration in Colorado marijuana. Its report concluded, “It is clear that use of products with high concentrations of THC are associated with higher rates of psychiatric disorders, such as schizophrenia, psychosis, and generalized anxiety.”

In 2020, Washington state also looked into potency and found “young people are particularly vulnerable to negative effects of high potency cannabis.” The Washington State Prevention Research Subcommittee vividly described modern THC products: “They are as close to the cannabis plant as strawberries are to frosted strawberry pop tarts.”



Marionberry-flavored THC-infused gummies for sale in Oregon in 2020. 5mg THC per piece.

The studies indicate marijuana use poses a great risk to our nation's kids. According to CDPHE, here is what we know from research on marijuana far less potent than Colorado kids are currently consuming:

- Weekly marijuana use by adolescents is associated with impaired learning, memory, math and reading, and a failure to graduate from high school.
- Adolescents who use marijuana are more likely to experience hallucinations, paranoia, and delusions as adults. Psychotic symptoms are worse with higher doses.
- Marijuana use that begins in adolescence (9-17 years of age) is associated with future marijuana addiction.

The risks associated with these highly potent products have led a renowned Colorado medical marijuana doctor and author to call for a ban on marijuana concentrates. Dr. Rav Ivker told Westword, a weekly alternative newspaper in Denver, "I think they should be illegal...The only thing they're good for is getting really high. But they're high risk, and there's no benefit from them." He said marijuana's reputation as non-addictive is dated and "goes back to maybe a decade or two ago" when THC potency was much lower. He is convinced that marijuana concentrates like shatter and wax have increased marijuana addiction, noting that "it's well known within the addiction-medicine community that this is a problem."

The people "most attracted to these products happen to be adolescents and young adults," said Dr. Ivker. And he warned: "Even more concerning than the addiction problem is the fact that our brains are still developing until we're in our mid-to-late twenties."

Youth Use Trends

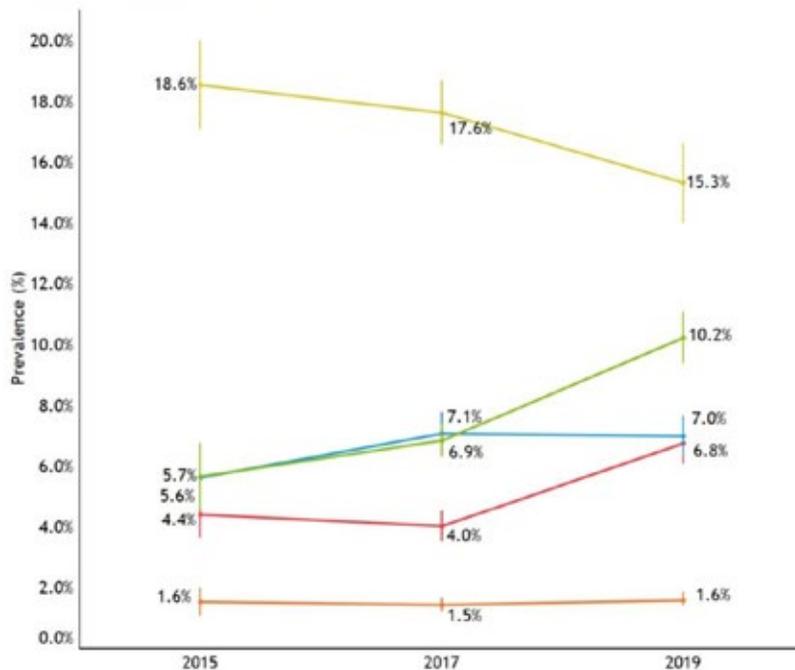
These highly potent, deceptively different THC products are getting into the hands of Colorado kids. The 2017 Marijuana Market Study concluded that "there are individuals under the age of 21 who consume marijuana and it seems reasonable that the source for some portion of the marijuana consumed is from the regulated market." The latest edition found that almost 39,000 pounds of marijuana were lost and unaccounted for in Colorado's regulated system during 2019.

In the City and County of Denver, the epicenter of marijuana cultivation, manufacturing, and sales, marijuana tops the list for substances that high school students say are “sort of easy” or “very easy” to get. They reported that marijuana is easier to get than alcohol, cigarettes, electronic vapor products, and pharmaceuticals.

Colorado teens are increasingly drawn to the new, ultra-potent THC products. In 2019, there was a significant increase in dabbing and vaping by high school students.

For context, it is worth comparing teen and adult use in Colorado. In 2019, Colorado teens dabbled and vaped concentrated THC at prevalence rates higher than Colorado adults, despite it being illegal for anyone under 21 years of age to use non-medical marijuana.

Figure 10: Biennial prevalence of method of marijuana use among high school students, Colorado 2015-2019



Produced by: Marijuana Health Monitoring Program, Colorado Department of Public Health and Environment 2020

Data Source: Healthy Kids Colorado Survey

Figure Notes:
95% Confidence Intervals indicated by bars

- Smoked
- Dabbed
- Ate
- Vaporized
- Used it in some other way

The Colorado dabbing numbers equate to 10.2% of the overall high school population. This outpaces the 3.7% of adults 18 and older who dabbled THC concentrates in 2019, according to the Colorado Behavior Risk Factor Surveillance System.

The same holds for vaping THC: 6.8% of Colorado high school students vape compared to only 6.1% of adults.

More than half of high school students who use marijuana reported that they dab THC to get high. Among students who reported using marijuana in the past 30 days, 52% said they dabbled it, up from 20.3% just two years ago – a 156% increase.

Teens in other legal states are also drawn to these ultra-potent THC products. In Oregon, which legalized adult-use marijuana in 2014, 44% of 11th graders who used marijuana in the past 30 days reported vaping and 36% reported dabbing in 2019.

And high school students are using THC products more frequently. In 2019, there were statistically significant increases in Colorado students using marijuana daily or near daily (20-39 times per month and 40 or more times per month). Overall 41.7% of Colorado high school students who use marijuana reported using 10 or more times per month. By 2017, one in three Oregon 11th graders who use marijuana reported using 10 or more days in a month. By 2018, 40% of Washington 10th graders and 47% of 12th graders who used marijuana in the past month used six or more days per month.

Young adults aged 18-25, who were in middle and high school when legalization occurred in Colorado in 2012, report almost double the national prevalence for past-year daily marijuana use (14.8% compared with 7.5%).

More than half (55.9%) of Colorado high school marijuana users still prefer to smoke marijuana, according to the Healthy Kids Colorado Survey. But, this is bitter consolation when the average potency of flower in Colorado is five times stronger (18.8% vs. 3.8%) than just a few decades ago.

National Youth Surveys and Many States Are Missing Dangerous Trends

National surveys including the Youth Risk Behavior Surveillance System, the National Survey on Drug Use and Health, and the Monitoring the Future Survey ask kids if they have ever used marijuana or used it in the past 30 days. The problem is these surveys lump all marijuana products together, regardless of potency. This creates a flaw in surveying and data collection.

Accurately assessing the impact of marijuana legalization on kids requires tracking more than just the prevalence of use. How youth use has changed over time in terms of frequency of use, THC potency, the products used, and methods of delivery is vitally important in the age of nuclear-strength marijuana.

Even if the overall use rate of marijuana has not increased, the products being used have changed. Kids' use of high-potency THC concentrates in dab rigs, vaporizers and edibles is increasing. This development makes the overall "marijuana" youth use rates red herrings.

Surveys that show stable teen marijuana use rates, but decreasing marijuana smoking rates, are red flags. Teens are replacing lower THC products with higher THC products.

CDPHE asks additional, more specific questions as part of the Healthy Kids Colorado Survey. The survey asks “How did you use marijuana?” and “How did you usually use marijuana?”. These questions provide telling answers from over 46,000 Colorado high school students on the many ways their use has evolved beyond smoking a joint.

Since 2015, the first survey after commercial recreational marijuana sales began in Colorado, high school students have reported a 17.7% decrease in smoking marijuana, dropping from 18.6% to 15.3% prevalence. However, in the same period, Colorado saw increases in high school students eating (+25%), vaping (+54.5%) and dabbing (+78.9%) processed, distilled THC products.

Oregon also saw increases in vaping and dabbing that more than offset the drop in marijuana smoking among 11th graders.

Colorado teens are not just sampling new forms of marijuana. They are switching to ultra-potent THC products.

Since 2015, dabbing, vaping, and eating as the usual method of use also significantly

increased among high school students who used marijuana in the past 30 days. The rate doubled for vaping, increasing from 5.1% to 10.6%, quadrupled for eating, increasing from 2.1% to 9.9%, and more than quadrupled for dabbing, increasing from 4.3% to 20.4%.

In Washington state, among 10th graders who reported past 30-day marijuana use, one in eight usually dabs, one in nine usually consumes edibles, and one in 15 usually vapes.



Vape pen cartridge containing 86% THC for a total of 404mg THC. The concentrate is distilled from a marijuana strain named after a Girl Scout cookie, Samoas.®

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States Regulate Weakly

The federal Food and Drug Administration does not enforce safety rules for these THC-based products as it does for similar non-THC products sold in drug stores and pharmacies. That is because marijuana and THC are illegal under federal law. This puts state and local health departments in the challenging position of serving as the regulators of last resort.

As of the publication of this white paper in February 2021, there are no restrictions on the methods of use of marijuana sold in Colorado. The joint and brownie are passé. The edible marijuana industry evolved quickly from marijuana gummies to marijuana liquids ranging from THC-infused coffee and tea to colorless, odorless powdered THC that users can sprinkle on any food or beverage to invisibly transform it into an intoxicant.

Hard-to-hide bongos have given way to slim vaping devices that resemble a computer USB flash drive. The newest products sold as recreational marijuana feature medical-like delivery methods including eye drops, nasal sprays, inhalers like those used by patients with asthma, and vaginal/rectal suppositories.

Colorado's MED is constantly two steps behind the industry because there is no pre-approval of products before they can be sold in stores. One Colorado health department official described their efforts to regulate the industry as "chasing cheetahs with butterfly nets."



66.6% aerosolized THC for sale in Colorado in 2019. This product is for inhalation.



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25mg THC-infused tablets for sale in California in 2019. The package illustrates the CA universal symbol for marijuana, but the product itself does not. Universal symbols vary by state. Some states require the edible itself be marked with the universal symbol.

A shopping trip through multiple adult-use states shows that Colorado regulators are far from alone in facing a behemoth industry with unlimited resources. In California, you can purchase 25mg tablets of activated THC with no mark that identifies they contain a psychoactive ingredient. In Nevada, you can purchase a 500mg fruit punch-flavored mouth spray. The wrapper, which contains a universal symbol for THC, is removable and the spray bottle is the size of a pen. In Oregon, you can purchase THC vaping liquid named after the Samoas Girl Scout cookie, or a 50mg square rice krispy treat.

Conclusion

Our children have only one chance to grow up. We must get it right the first time. Yet, the state legislative and regulatory agencies responsible for legalized and commercialized marijuana are not rising to this growing challenge.

Shifting youth use patterns are a warning to parents, educators, elected officials, regulators, and healthcare professionals: Kids are using THC products that are exponentially stronger than what their parents and the previous generations may have experienced. Data from early legalizing states show that our nation's youth are consuming today's new and radically different marijuana at THC potency levels and frequencies that raise scientifically proven risks of psychiatric disorders, physical dependence, and addiction.



Tropical punch-flavored mouth spray for sale in Nevada in 2020. This product is consumed by spraying in the mouth or under the tongue. Contains 500mg THC.



Product label is easily removed and the spray is about the size of a pen.

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Parents and educators find it difficult to spot today's high-THC products. They may not know to look at the mouth spray or breath mints, the removable computer drive, the pen, the nasal spray, or the lollipop in their child's bedroom or backpack. This misperception is reinforced by the media that still portrays marijuana as a plant, not the easily concealable THC products of today.

Seven years into this enormous shift in the normalization of and access to marijuana, elected officials and regulators in states with commercial marijuana markets must start to ask the right questions of their teens, listen to their medical experts, and take back control of a THC market that is out of control.

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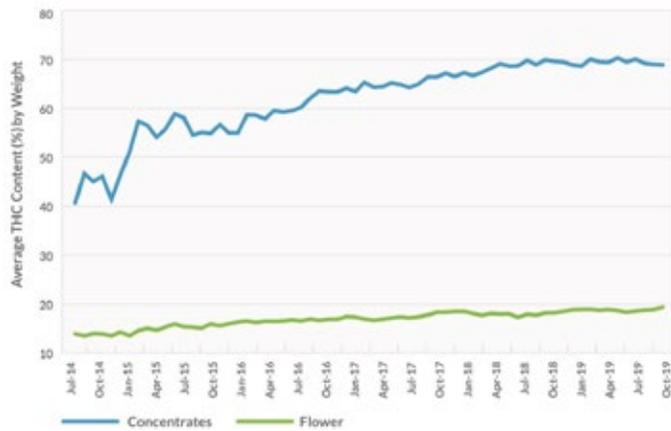


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MARKET TRENDS

AVERAGE THC CONTENT (%) PER GRAM OF FLOWER & CONCENTRATE



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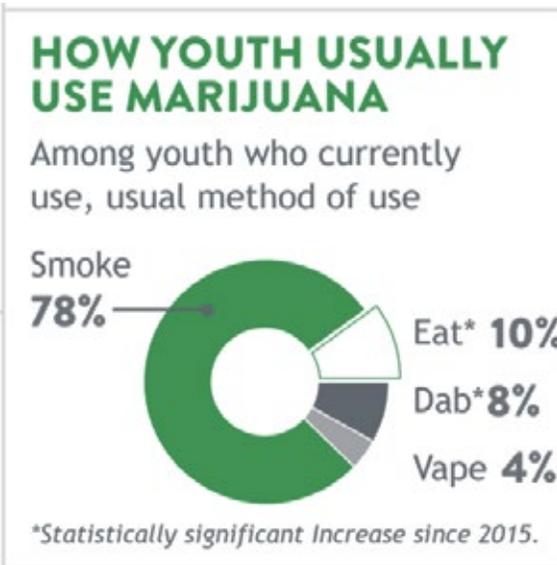
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About the Author

Attorney Rachel O’Bryan, a graduate of University of Michigan School of Law, has been involved in Colorado’s historic recreational marijuana legislative and regulatory process since 2013. She was appointed by former Governor John Hickenlooper to serve on a subcommittee of the Amendment 64 Implementation Task Force to provide a voice for citizens, including the community and kids.

She was also appointed by the State Marijuana Enforcement Division to serve on several stakeholder working groups focused on rule-making for Retail Marijuana Product Potency and Serving Size, Production Caps, Record-keeping, Enforcement, and Discipline. Rachel served on Denver’s Marijuana Social Consumption Advisory Committee to assist Denver Excise and License with implementation of the 2016 Denver voter Initiative 300.

She is a co-founder of One Chance to Grow Up (onechancetogrowup.org), which shares with the nation what we’ve learned in Colorado as the first nonprofit in the U.S. dedicated solely to protecting children in the age of legal marijuana. One Chance to Grow Up is an initiative of Smart Colorado, a project of the Colorado Nonprofit Development Center.